JUNIOR SCHOLASTIC

FEB. 4, 1939
VOL. 4 NO. 1

THIS ISSUE:
OIL COUNTRY

Photo on front cover shows group of young skiers at New Hampshire snow carnival (F. S. A. photo by Rothstein)

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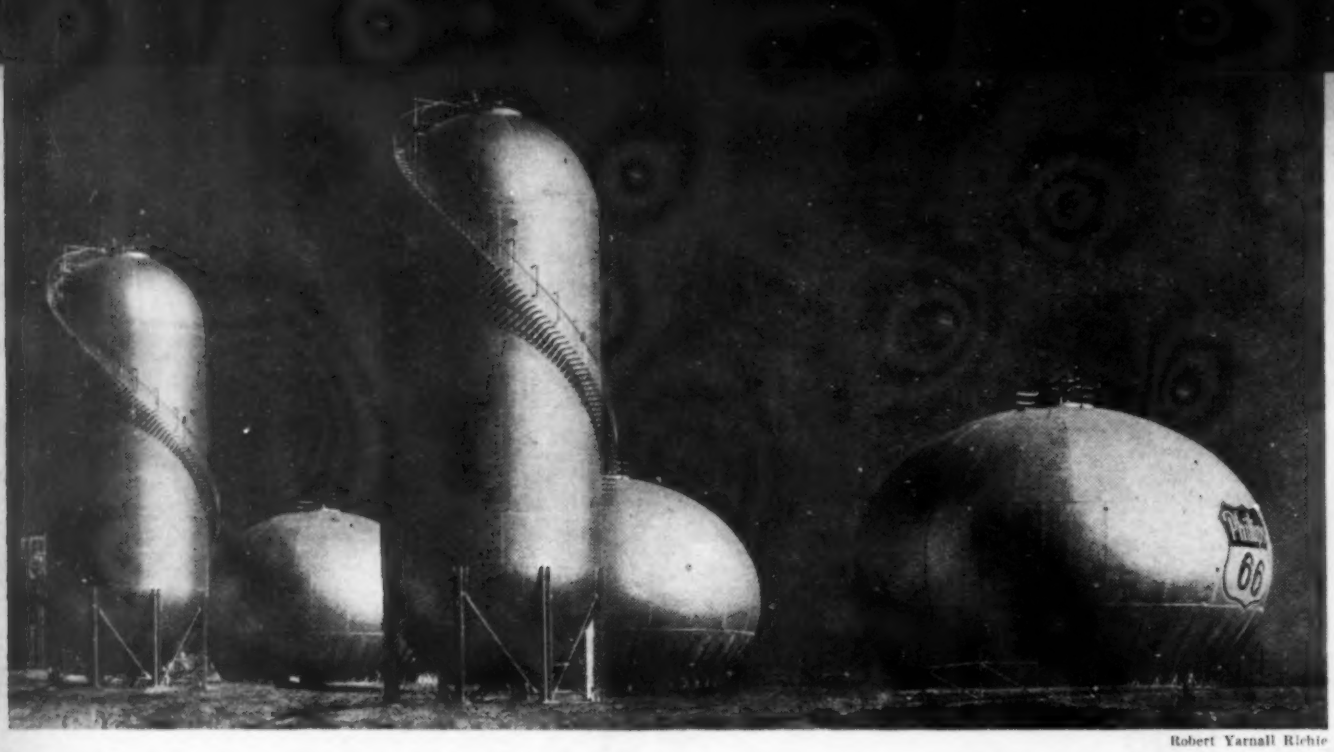


Robert Yarnall Richie

TEXAS TANKS: Striking photo above shows tanks in East Texas for storing gasoline (in spheroid tanks) and butane (in tall tanks). Tanks are constructed this way so that contents can be kept under high pressure.

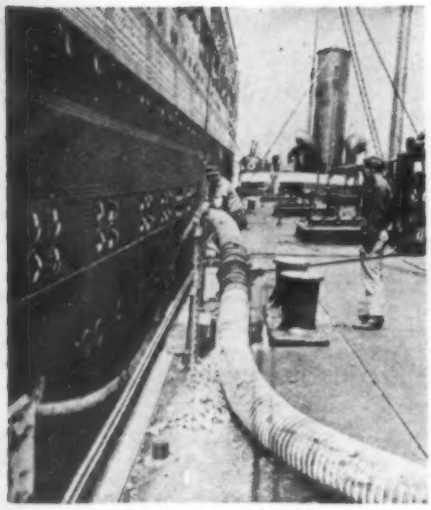
TANKS, SHIPS AND MEN

Ewing Galloway

FIRE FIGHTER: The hardest kind of fire to fight is an oil fire. Special equipment and trained fighters must be used, and sometimes it takes weeks to put out the fire. Photo at left shows oil fire fighter in asbestos suit, standing with a field worker. Fire fighter has just come out of a fire at Corsicana, Texas.

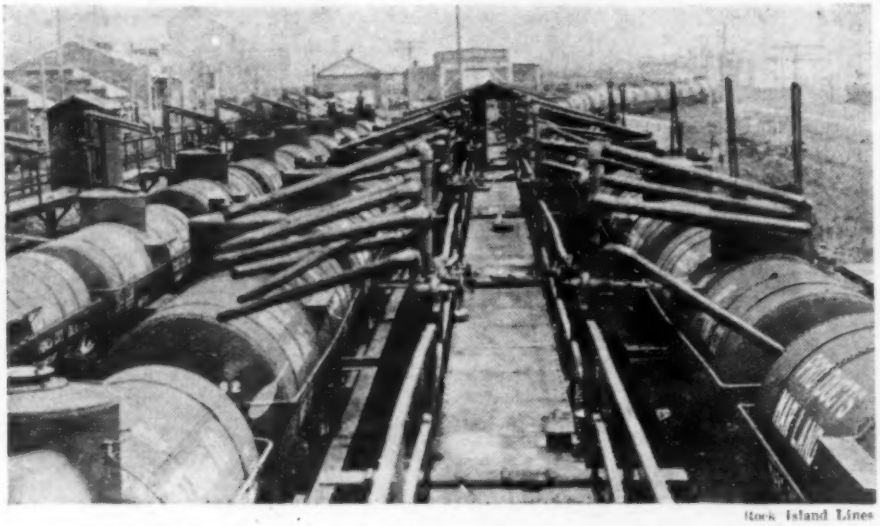
OIL and gasoline are transported various ways—by pipe lines (see page 5), tank ships, railroad tank cars, and tank motor trucks. Photo at right shows the tank ship "Gulfmaid" of Port Arthur, Texas. She has a cargo of gasoline (in bulk) and lubricating oil (in 55-gal. drums, which you see on pier in foreground.)

Robert Yarnall Richie for Gulf Refining Co.



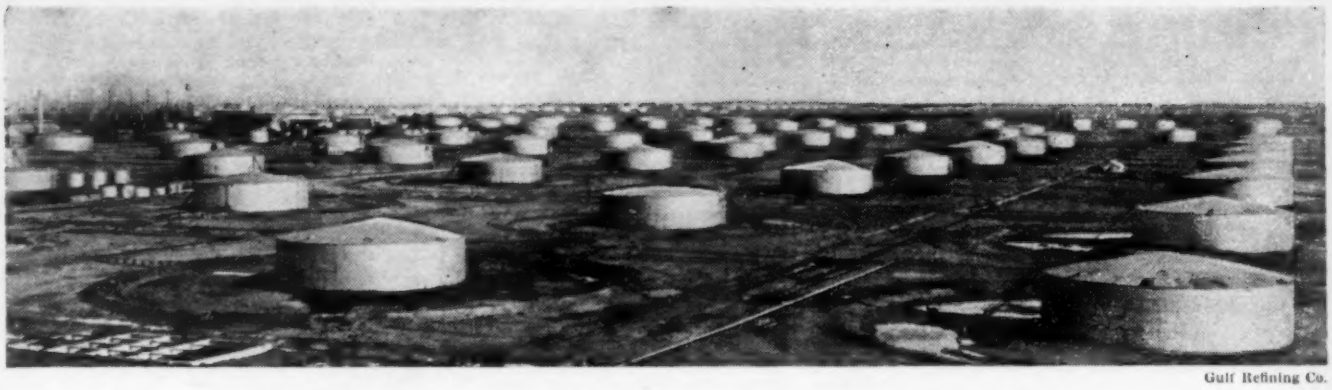
American Petroleum Institute

BUNKERING an ocean liner from an oil tank ship. Most ocean liners use oil for fuel. In port, they are bunkered (fed oil) through a big hose which leads to an oil tank ship brought alongside. Photo shows deck of the tank ship and starboard side of the liner.



Rock Island Lines

TANK CARS, holding 8,000 to 10,000 gallons, transport gasoline, oil and other liquid petroleum products by rail. Photo above shows tank cars at the Marland Oil Refining Company plant at Ponca City, Oklahoma. Note movable pipe "elbows" which can be adjusted to fit into opening at top of tank car. Pipes are connected with main pipe line leading to the storage tanks. There are about 150,000 railroad tank cars in the United States. Every year, the oil companies pay about 250 million dollars to the railroad companies for transporting petroleum products.



Gulf Refining Co.

PETRO (rock) OLEUM (oil)

Our Country Leads in World Production

TO START the new semester, the editors of Junior Scholastic want to say a word by way of introduction to new subscribers. (Old subscribers may skip this paragraph.) Each issue of Junior Scholastic deals with a certain section of our country. Last semester, in 16 issues, we covered the Atlantic Seaboard and the Mid-West. Now, starting the second semester, we continue our All-America series with this issue on the Oklahoma, Texas and East Kansas oil region.

This is an opportunity for your class to study petroleum production, refining, and transportation. The many photographs and diagrams in this issue will give you a better understanding of this great industry.

A Fascinating Subject

After reading this issue, you will know how oil is located underneath the ground, how wells are drilled, how the crude oil is made into gasoline, fuel oil, lubricating oil, kerosene, and other products. We believe you will find OIL a fascinating subject.

You don't need to be reminded of the importance of petroleum in our daily lives. Somebody said, "Oil makes the world go around." Well, not quite. But it does make most of the wheels of the world go around.

Start first with the most common use of petroleum products—in automobiles. They need gasoline, lubricating oil, and grease.

Look up in the air. Airplanes need the very finest gasoline and lubricants* that science can develop.

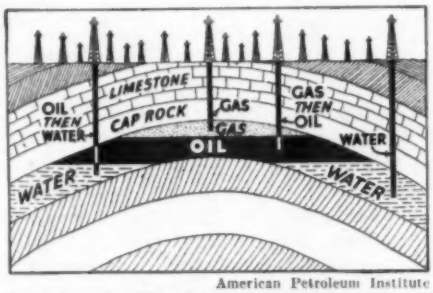
Now take to the water. Big lake and ocean liners and freighters formerly used coal. But in the past 20 years they have converted (changed over) their engines to the use of oil. Today there are more oil-fueled ships than there are coal-fueled.

Farm Machinery

Now let's return to dry land. On the farm, tractors do a great deal of the work—pulling plows and other field machinery, and providing power for operating machines used in storing and preparing farm products for market. Most tractors have gasoline engines. Some have Diesel engines, which use oil for fuel.

Industry uses petroleum products in hundreds of ways. All machinery needs lubrication, and the oils and greases which are used for this purpose are derived from crude oil (the oil, or petroleum, as it comes out of the ground).

Just think of the many uses of petroleum products in your own home. Perhaps you do not have an oil-burning furnace, but you do have soap, polishes for your furniture, floors, metal, and shoes; ointments and salves for medicinal purposes; vaseline, face oils and creams for the face and hands. These all have a petroleum base.



American Petroleum Institute

This drawing illustrates two important points: (1) it shows how layers of rock hold pools of oil deep down in the ground—thousands of feet down; (2) and it shows how it is possible to miss the oil when you are drilling a well, though you may be drilling within a short distance of a well that's "in." Note pocket of gas. Much gas is mixed in with the oil.

Gas and Oil Together

If you are living in a house that has not yet been supplied with electric current, then you use oil or gas for illumination. Many homes have oil or gasoline stoves. Just a word about gas. Where there's oil there's gas. (See drawing below.) If gas is found in sufficient quantities, it is piped for sale to homes and factories. As you know, gases can be changed to liquids, and liquids to gases, or vapors. Some gasoline today is being made from natural gas.

Our Real Wealth

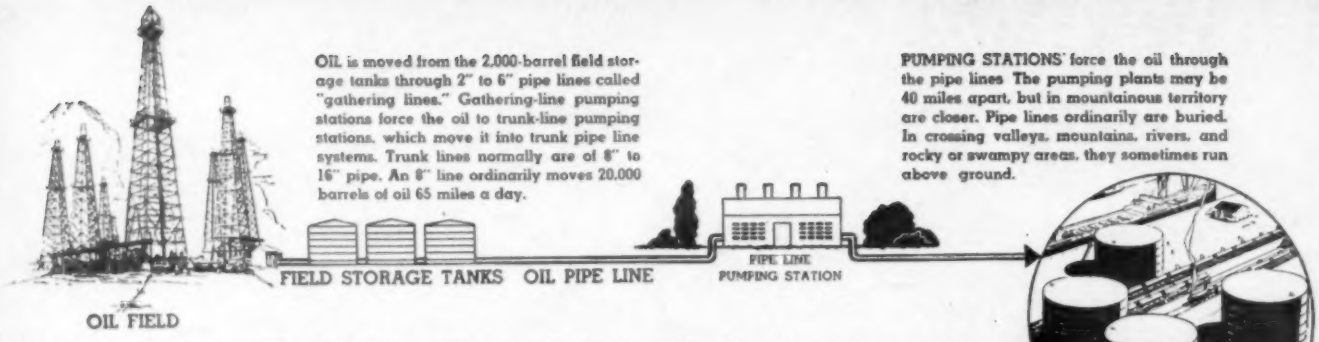
You have heard it said that the United States is a rich country. This is true, and all of us are thankful for it. A nation is rich or poor, depending on *what it can get out of the ground.* When you speak of the wealth of a nation, don't think of dollars and cents. Think of the treasure that lies in the nation's soil and on down.

Good soil is our basic wealth, and without good farms and farmers we would indeed be a poor nation. But we have good farms and good farmers. And we have still more riches in the fuel that lies buried underground—coal, oil and gas.

Uncle Sam has his "pockets" full of oil. There are 300,000 oil wells in our country, producing every day 2,500,000 barrels of crude oil. Sixty-two per cent of the world's oil supply comes from the wells of the U.S.A. Next biggest producers are Russia,

*WORDS TO THE WISE. *Lubricant (loo*-brikant), noun. Any material used on machine parts to make them slippery and thus lessen friction ("rubbing") between them. From *lubricus*, a Latin word meaning "slippery."

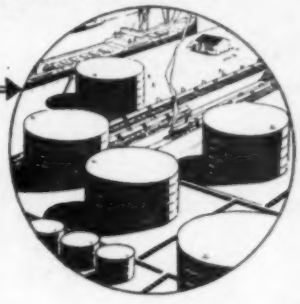
JUNIOR SCHOLASTIC, a weekly for the Upper Elementary Grades and Junior High Schools. Published every week during school year — Sept. through May inclusive, except during holidays at Thanksgiving, Christmas, Mid-term and Easter, by Scholastic Corporation: M. R. Robinson, Editor. Entered as second-class matter Sept. 1, 1937, at the post office at Pittsburgh, Pa., under the Act of March 3, 1879. Additional second-class entry at Dayton, Ohio. Contents copyright 1939 by Scholastic Corporation. Subscription price: For two or more copies to one address 80c a year or 40c a semester each; single subscription, $1.25 a year. Single copy 5c. Junior Scholastic, Chamber of Commerce Bldg., Pittsburgh, Pa.

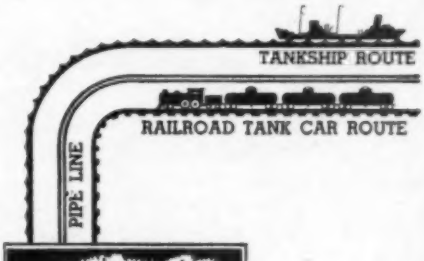


Oil is moved from the 2,000-barrel field storage tanks through 2" to 6" pipe lines called "gathering lines." Gathering-line pumping stations force the oil to trunk-line pumping stations, which move it into trunk pipe line systems. Trunk lines normally are of 8" to 16" pipe. An 8" line ordinarily moves 20,000 barrels of oil 65 miles a day.

PUMPING STATIONS force the oil through the pipe lines. The pumping plants may be 40 miles apart, but in mountainous territory are closer. Pipe lines ordinarily are buried. In crossing valleys, mountains, rivers, and rocky or swampy areas, they sometimes run above ground.

Charts courtesy of American Petroleum Institute





The chart above shows the journey crude oil takes from the well to the refinery. From the refinery, the gasoline, fuel oil and other products are transported by tank car, tank ship or pipe line to distribution centers. From there, tank trucks take the gasoline to filling stations; the fuel oil to homes and factories.

with 10%, and Venezuela, with 9%. Our neighbor on the south, Mexico, is the third largest producer in the Western Hemisphere. Mexican oil is very much in the news these days. (See latest development in Headline News, page 11—"N. Y. Times Reporter Expelled from Mexico.")

In the United States, oil is produced in 22 states. They are grouped, by oil men, in five districts. The largest oil producing district is called the Mid-Continent, and includes Oklahoma, Kansas, Texas, Missouri, Arkansas, and Mississippi. Texas is far and away the biggest producer, 510,732,000 barrels last year. California (an oil district by itself) is second with a little more than half as much, and Oklahoma is close on California's heels. Kansas ranks fifth, and is fast moving up. Nowadays many Kansas farmers are wondering whether they should stick to wheat or start drilling for oil.

How Much? How Long?

When oil is first struck in a district, land values go sky-rocketing. Fortunes are made and lost, as some "strike it rich" and others drill on and on without reward. It usually costs about $25,000 to drill a well, and it may cost as much as $100,000. Every year, 20,000 new wells are drilled in the United States. Some of them can be drilled for much less than $25,000, because the oil does not lie so deep. About a third of the new wells fail to produce oil or gas.

An oil well may produce as much as 30,000 barrels of oil a day (24 hours) or as little as one barrel. The average production of the 300,000 active wells is 8 barrels per day. The price of crude oil is about $1 per barrel. At this price, the average well must produce 25,000 barrels before it can pay for drilling costs. But once it has paid this initial cost, an oil well pours out profits for its owners.

How long does an oil well keep flowing? Some dry up after a few months. Others keep flowing for years. Some wells have been yielding oil for 50 years. Their yield today is much less than it was at first, but a barrel a day is enough to give the owner a profit.

From the diagram on page 3, you will note that gas is commonly found just above the "pocket of oil." Gas is also found in with the oil as it lies among the grains of sand in the great underground reservoirs. This natural gas keeps the oil thinner and, when a hole is drilled down into the oil reservoir, the gas causes the oil to flow up. That's why it is not necessary to pump up the oil in most wells.

Oil operators realize the great value of this gas, for when the gas is wasted by improper drilling and operation, the natural pressure is lost. Then the oil has to be pumped up. In recent years, operators have found that gas can be forced down into weak wells, to cause the oil to flow.

Refining Crude Oil

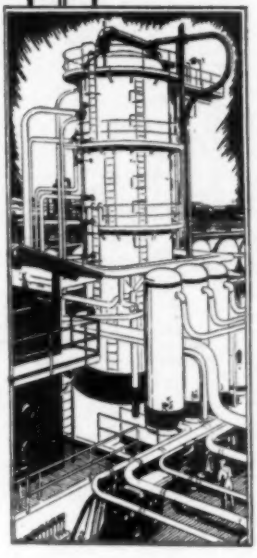
Eighty-six percent of the crude oil taken from all the wells in the United States is converted into gasoline, kerosene and fuel oil.

In big refineries, the crude oil is converted into the various types of fuels and lubricants. One hundred gallons of crude oil produce 44 gallons of gasoline, 36 gallons of fuel oil, 6 of kerosene, 3 of lubricants, and 8 of miscellaneous products. Three gallons are lost in the process.

To obtain so many different kinds of oil products from the crude oil, the refineries operate a distillery. In the distillery, the crude oil is heated to its boiling point, passing the vapors from the boiling oil through condensing pipes until they begin to cool. As they cool, they turn back to liquid. Some cool before others. The first vapor to change back to liquid becomes gasoline, the second kerosene, the third gas oil, the fourth lubricating oil, and last the "heavy bottom" oils from which coke, asphalt and paraffin are made.

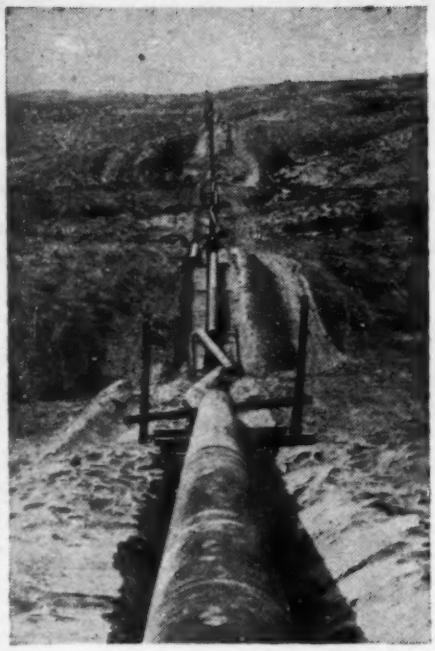
It took Nature millions of years to form the reservoirs of oil and gas, and the deposits of coal, in the ground. At the rate we are taking oil out of the ground—2,500,000 barrels daily—how long will the supply last? No one knows. Scientists have located 13 billion barrels of oil still underground. We use about a billion barrels a year. This does not mean that in 13 years, we will be without oil. New fields are being developed, and methods of avoiding waste are being used more and more. The waste has been frightful. For every barrel of oil removed, the same amount has been lost by careless operation.

No one can say for certain what the future will bring. But with our most precious treasures we should never be wasteful. As citizens and future voters, you have a great stake in the wealth of America. And wealth means *the earth and the goodness thereof.*



The refinery (left) receives crude oil by tank ship, tank car, and pipe line, holding it in refinery storage tanks until it is started through the refining process. Pumped directly into refining equipment, it emerges in the form of useful products — gasoline, kerosene, fuel oil, lubricating oil, wax, asphalt, coke.

Cross Country Pipe Lines



Bureau of Mines

OVER HILL, OVER DALE: Photo above shows sections of a newly-laid pipe line, ready to be joined together, the joints welded by a welding machine, and the pipe lowered into the ground. Small travelling cranes, on tractors, handle pipe when it is lowered. Then the pipe is covered with dirt.

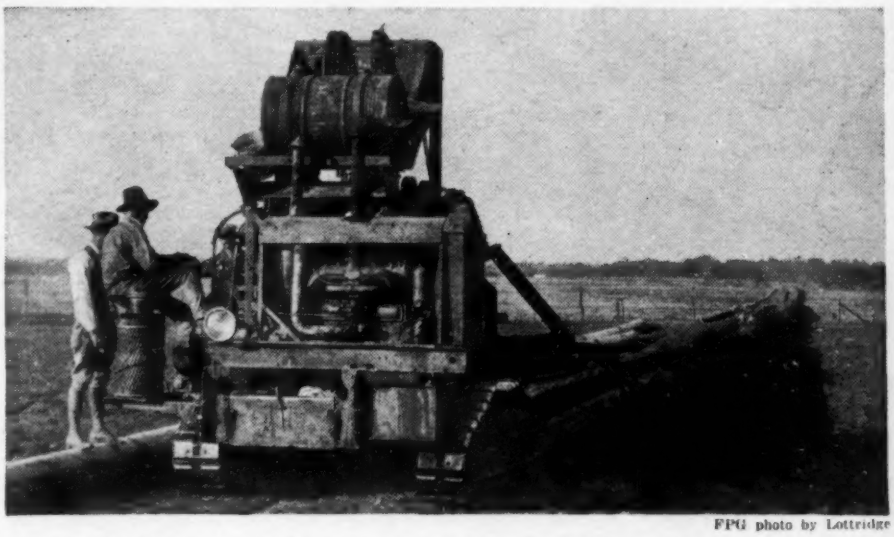
PHOTO ON RIGHT shows tractor ditch-digger, which digs a trench deep enough for the pipe. Digger moves ahead slowly, digging an even trench and pouring the dirt out over the side. Note location of operator's seat.

PEOPLE who lived in New York City a hundred years ago bought their water from a peddler with a water-cart. Today the water used in New York City travels in pipes from the Catskill Mountains, and is pumped into a million kitchens and bathrooms. So it is with all cities.

● Nowadays there is so great a demand for oil and gasoline in all parts of the country that the oil companies are transporting millions of gallons through pipe lines. These pipe lines run from the oil wells to refineries and distribution centers many miles away.

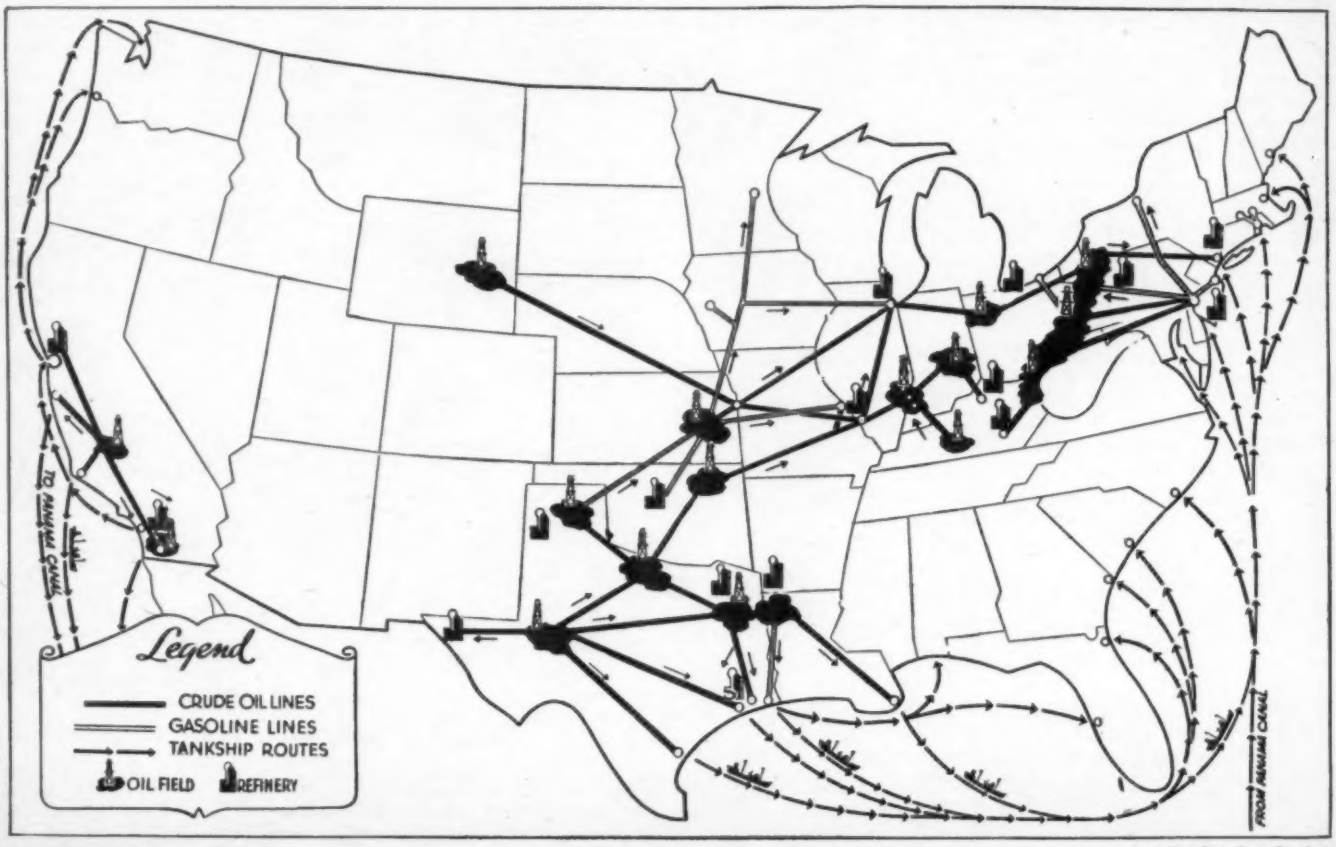
● Trains, trucks, and ships are used to transport oil where pipe lines are not available. The map at the bottom of this page shows the main long-distance oil and gasoline pipe lines in the United States. There are also other pipe lines —in the same region as the oil lines—to carry fuel gas. Fuel gas usually gathers in underground pockets above an oil pool. (See drawing on page 3.)

● Don't be surprised if you soon hear of coal being transported by pipe lines. Experiments are now being conducted with pulverized coal, which can be carried along in a flow of water or oil.



FPG photo by Lottridge

MAP below shows the location of the important oil fields of the United States, the main refineries, and the chief routes of 115,000 miles of oil and gasoline pipe lines in America. The lines of arrows in the ocean regions mark the most important routes of oil tankships.



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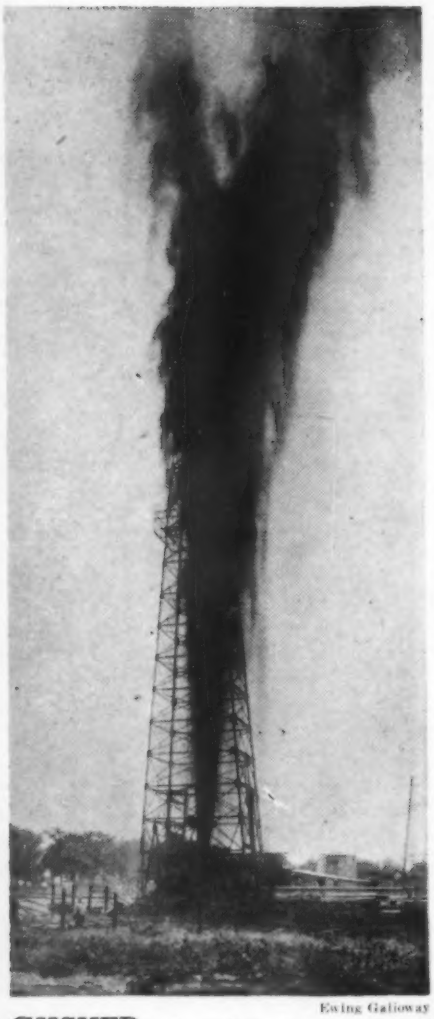
WORDS TO THE WISE

Here are definitions of the oil terms you will meet as you read through this issue



Ewing Galloway

GUSHER: A gusher is an oil well which has "come in" out of control. If the final stages of drilling are done properly, the oil will rise to the surface under control of the valves. Gushers are now considered evidence of poor methods, carelessness, or faulty equipment. Above photo shows gusher at Oklahoma City. The spouting oil causes waste, danger, damage and financial loss.

bit. Block of steel with blunt teeth, which does the cutting in the bottom of the well hole. (See photo on p. 9.)

blow-out. Sudden escape of gas from well when high pressure gas is encountered, and no adequate means to control the escape has been made.

casing. Steel pipe, cylindrical in form, which is welded or screwed together and lowered into the hole during drilling. Its purpose is to support the sides of the well to prevent the hole from caving in.

casinghead. Fitting screwed on top of the casing to control the flow of oil.

cathead. A hoisting apparatus used in rotary drilling to screw up or break out the casing.

core. Sample of material taken by a hollow drilling bit from a well that is being drilled. Tests are made of this sample to see if the oil sands have been reached, or to determine the formations through which the well is passing.

drill pipe. The whole string of tubular pipe connected to the bit. The drill pipe revolves during drilling, causing the bit to revolve.

drill-stem. The top joint of drill pipe which is gripped in the rotary table. It is also called the Kelly joint.

fishing. Method of recovering lost tools, casing or other pieces of equipment from the well by special tools.

flow-line. Line of pipe leading away from a flowing well and conducting the oil and gas from it.

geologist. A scientist who deals with the history of the earth and its life. He makes a special study of rocks.

mud-hogs. Pumps that circulate mud and water through the drill pipe to clean out the ground-up rock, or cuttings, from the bottom of the well, as the drilling proceeds. Some of the mud also becomes plastered on the sides of the well and helps to prevent caving.

oil pool. A large oil-producing area pocketed underground. (See drawing on p. 3.)

oil sands. Porous formation—limestone, sandstone, or sand—from which oil is obtained.

oil string. Pipe put in well to conduct the oil through the casinghead to the surface.

packer. A device used to control gas and oil pressure, causing the oil to flow through the oil string or tubing.

proved up. This is an expression describing oil territory proved to be productive by actual drilling.

rotary-table. A geared, rotating table which propels the drill stem.

roughneck. A laborer in a well-drilling crew, often called a "rotary helper" or "rotary roustabout." There are two "roughnecks" or "rotary helpers" on each drilling crew. Other members of the drilling crew are the head driller, the derrick man, and the fireman. Sometimes one of these workers acts as cathead man.

seismograph. A machine which records the type of rock formation beneath the surface. A "detector" is lowered down into a test hole, and this instrument picks up sound waves created by a discharge of dynamite.

strata. Layers of sedimentary rock or earth.

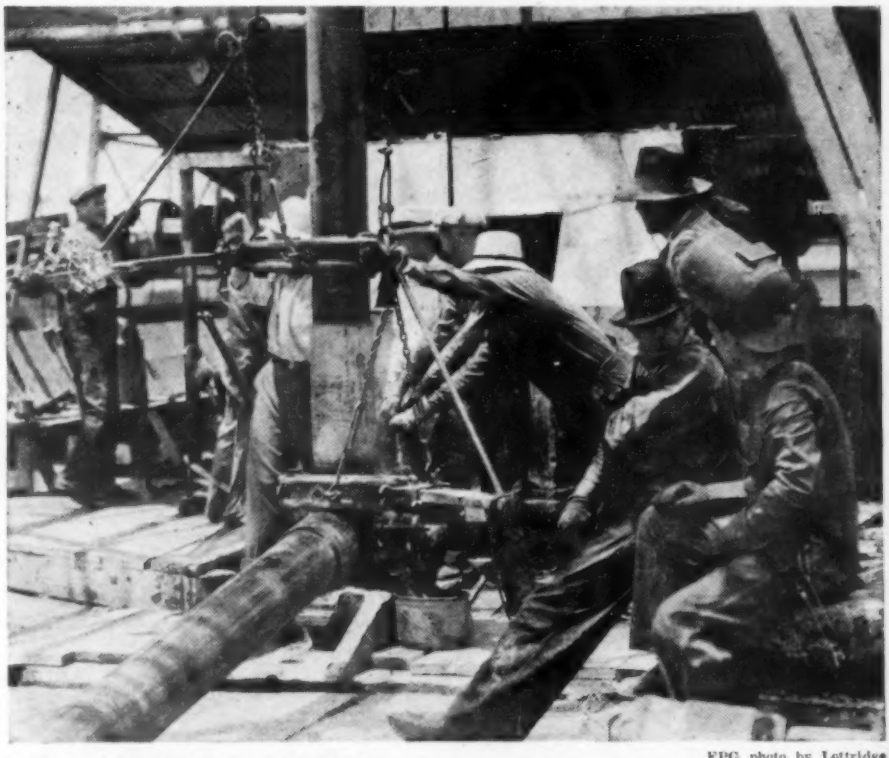
string of tools. The entire rotary drilling outfit including the drill pipe.

tankage. The storing of oil in tanks. Also the tanks themselves.

test hole. A hole dug in the ground, into which a seismograph instrument is lowered to determine the nature of the rock formations.

twist - off. Accidental breaking of drill pipe in the drill hole.

water-string. The string of casing used to shut off the water above the oil sands.



FPG photo by Lottridge

TWO DRILLING CREWS get together to set a new section of casing in the well. Note welder sitting at extreme right, wearing asbestos gloves and face shield thrown up over his head. He is waiting until the drilling crew is ready for the joint to be welded.

BRINGING HER IN

Story of a Boy and His Dad, Who Drill for Oil

By UPTON SINCLAIR

DRILLING for oil was an exciting business, Bunny thought. He was thirteen, and Dad, his father, was teaching him all about the oil industry from the ground up. Or perhaps we should say "from the ground down." Dad, whose name was J. Arnold Ross, had lots of oil wells. Once he had been a mule driver in a construction camp, but now he was an important oil operator. Dad's grammar wasn't all it should be, but he knew how to drill for oil.

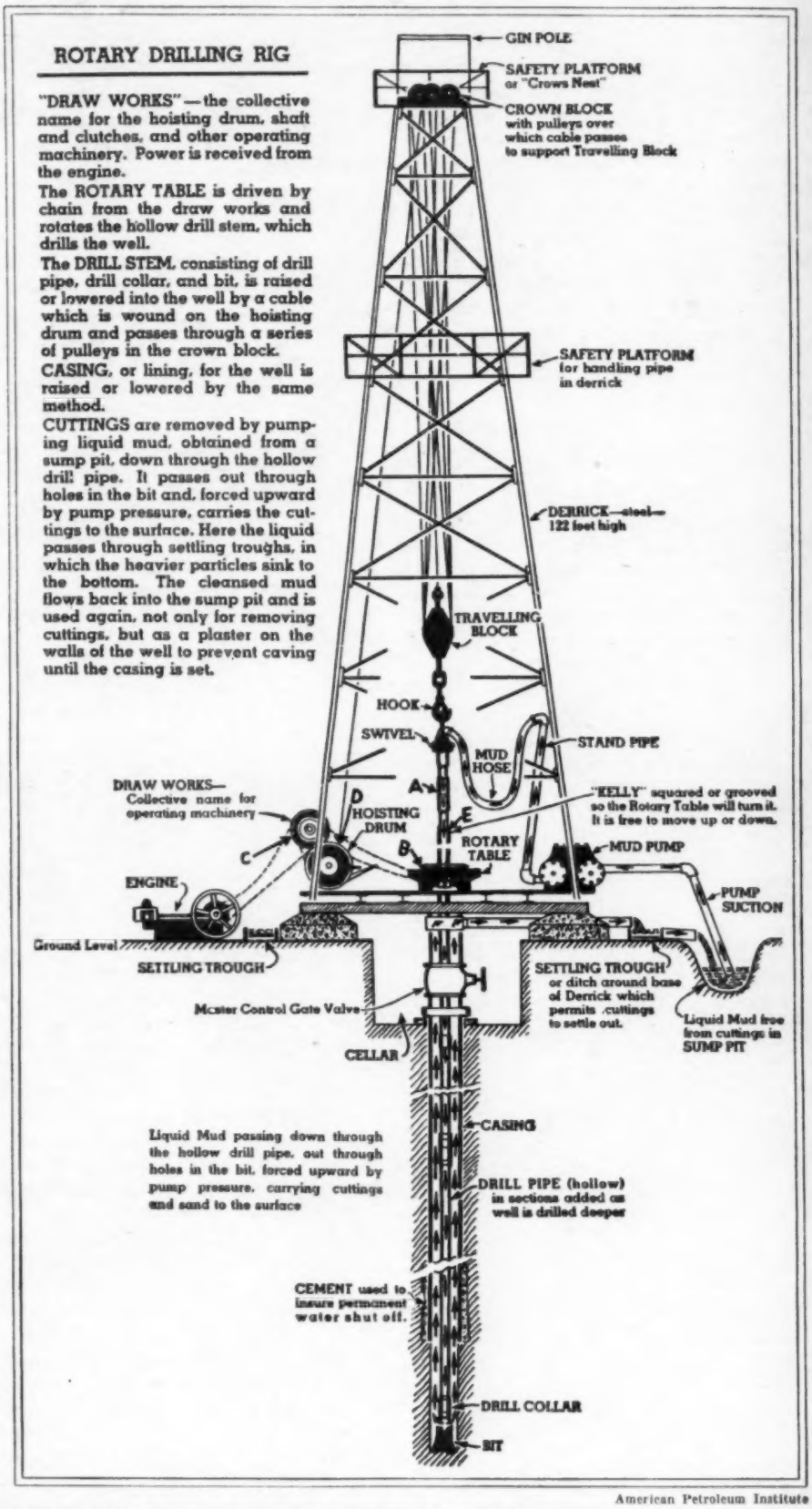
● Everything Dad did Bunny imitated. When Dad rushed out to the oil field to look over a drilling crew, there was Bunny right behind him, his bright brown eyes sparkling and curious to see what was going on. And when Dad told his men what to do, Bunny stood right beside him, drawn up straight, looking for all the world like Dad. Bunny even came to walk like Dad, and he had the same way of snapping out his words, as though he *meant* them.

● The Ross-Bankside No. 1, Dad's newest oil well, occupied most of Bunny's time now. Dad had leased it from a Mr. Bankside. Then he had erected a derrick on the oil plot and begun the drilling. Almost every day now, Bunny and Dad went out to see how the drilling was coming along. The men and machinery at work fascinated Bunny. Drilling a little hole a mile or more long, straight down into the earth—until they reached oil—that was a big job. Here is what Bunny saw and learned during the drilling. It is reprinted from Upton Sinclair's novel *Oil*.*

FAR down in the ground, underneath the Ross-Bankside No. 1, a great block of steel was turning round and round. The under surface of it had blunt steel teeth, like a nutmeg-grater; on top of it rested a couple of thousand feet of steel tubing, the "drill pipe," a weight of twenty tons pressing it down; so, as it turned, it ate into the solid rock, grinding it to powder. It worked in the midst of a river of thin mud, which was driven down through the center of the hollow tubing, and came up again between the outside of the tubing and the earth.

The river of mud served three purposes: it kept the bit and the drill pipe from heating; it carried away the ground-up rock; and as it came up on the outside of the drill pipe, it was pressed against the walls of the hole, and made a plaster to keep the walls rigid, so that they did not press in upon the drill pipe. [See opposite page for definitions of technical terms.]

*The chapter is reprinted here by permission of the author. Mr. Sinclair is one of America's foremost writers. His 60 books have been published in 700 editions and in 45 languages. Mr. Sinclair lives in Pasadena, California.


ROTARY DRILLING RIG
"DRAW WORKS"—the collective name for the hoisting drum, shaft and clutches, and other operating machinery. Power is received from the engine.
The ROTARY TABLE is driven by chain from the draw works and rotates the hollow drill stem, which drills the well.
The DRILL STEM, consisting of drill pipe, drill collar, and bit, is raised or lowered into the well by a cable which is wound on the hoisting drum and passes through a series of pulleys in the crown block.
CASING, or lining, for the well is raised or lowered by the same method.
CUTTINGS are removed by pumping liquid mud, obtained from a sump pit, down through the hollow drill pipe. It passes out through holes in the bit and, forced upward by pump pressure, carries the cuttings to the surface. Here the liquid passes through settling troughs, in which the heavier particles sink to the bottom. The cleansed mud flows back into the sump pit and is used again, not only for removing cuttings, but as a plaster on the walls of the well to prevent caving until the casing is set.
GIN POLE
SAFETY PLATFORM or "Crows Nest"
CROWN BLOCK with pulleys over which cable passes to support Travelling Block
SAFETY PLATFORM for handling pipe in derrick
DERRICK—steel—122 feet high
TRAVELLING BLOCK
HOOK
SWIVEL
MUD HOSE
STAND PIPE
"KELLY" squared or grooved so the Rotary Table will turn it. It is free to move up or down.
DRAW WORKS—Collective name for operating machinery
HOISTING DRUM
ROTARY TABLE
MUD PUMP
ENGINE
PUMP SUCTION
Ground Level
SETTLING TROUGH
SETTLING TROUGH or ditch around base of Derrick which permits cuttings to settle out.
Liquid Mud free from cuttings in SUMP PIT
Master Control Gate Valve
CELLAR
CASING
Liquid Mud passing down through the hollow drill pipe, out through holes in the bit, forced upward by pump pressure, carrying cuttings and sand to the surface
DRILL PIPE (hollow) in sections added as well is drilled deeper
CEMENT used to insure permanent water shut off.
DRILL COLLAR
BIT

American Petroleum Institute

Follow this diagram as you read Mr. Sinclair's story of oil drilling. This diagram shows the Rotary Drilling Rig for drilling oil well. See diagram on the next page for an older method of drilling, not used much today.

Up on the top of the ground was a "sump-hole" of mud and water, and a machine to keep up the mixture; there were "mud-hogs," snorting and puffing, which forced it down inside the pipe under a pressure of 250 pounds to the square inch. Drilling was always a dirty business; you swam in pale grey mud until the well came in, and after that you slid in oil.

Also it was an expensive business. To turn those twenty tons of steel tubing, getting heavier every day as they got longer—that took real power. When the big steam engine started pulling on the chain, and the steel gears started their racket, Bunny listened, delighted. Some engine, that! Fifty horsepower, the cathead-man would say; and you would imagine fifty horses harnessed to an old fashioned turn-table with a pole, such as our ancestors employed to draw up water from a well, or to run a primitive threshing-machine.

Putting in the Casing

Yes, it took money to drill an oil-well. You had to be prepared to go six or seven thousand feet, which meant from three hundred to three-hundred and fifty joints of pipe; also casing, for you could not leave this hole very long without protection.

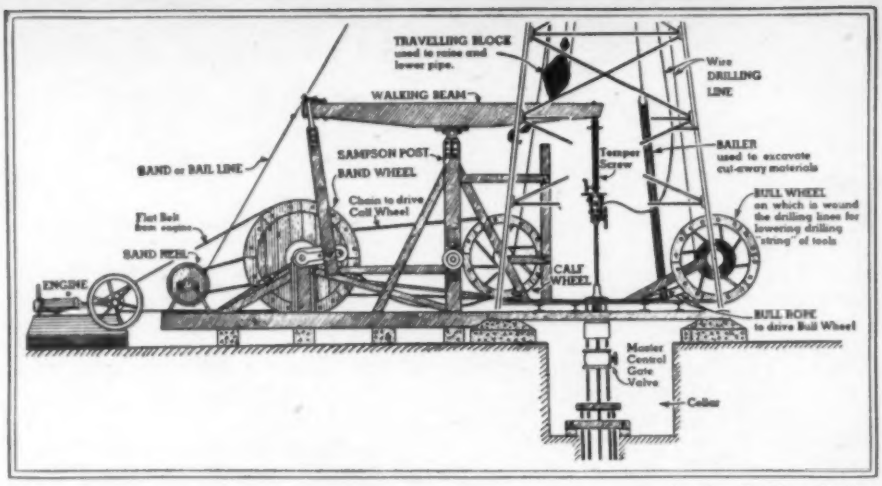
There were strata of soft sand, with water running through, and when you got past these you would have to let down a cylinder of steel or wrought iron, like a great long stove pipe; joint after joint you would slide down, carefully welding them together, making a water-proof job; and when you had this casing all set in cement, you would start drilling with a smaller bit, say fourteen inches, leaving the upper casing resting firmly on a sort of shelf.

So you would go, smaller and smaller, until, when you got to the oil-sands, your hole would have shrunk to five or six inches. If you were a careful man, like Dad, you would run each string of casing all the way up to the derrick-floor, so that in the upper part of the hole you would have four sets of casing, one inside the other.

24-Hour Job

All day and all night the engine labored, and the great chain pulled, and the rotary-table went round and round, and the bit ate into the rock. A crew had to be on the job every moment, to listen and to watch.

There were many things that might go wrong. Dad was liable to be waked up at any hour of the night, and he would give orders over the telephone, or perhaps he would slip into his clothes and drive out to the field.



American Petroleum Institute

OLD METHOD OF DRILLING, still used for some wells today, is known as "Cable Tool" drilling. Diagram above shows main part of rig. Instead of drilling the hole by a rotary (revolving) drill, the Cable Tool drill hammers a hole into the ground. This is done by lifting the "string" of tools a few feet and letting them drop. This repeated raising and dropping of the "string," with the pointed steel bit at the end, digs the hole. Note in diagram the "walking beam" which moves like a see-saw and raises and lowers the "string" of tools.

Next morning, at breakfast, he would tell Bunny about it—that fellow Dan Rossiger, the night-foreman, he sure was one balky mule; he jist wouldn't make any time, and when you kicked, he said, "All right, if you want a 'twist-off.' " And Dad had said, " 'Twist-off' or no 'twist-off,' I want you to make time."

And so, sure enough, there was a "twist-off" right away! Dad vowed that Dan had done it on purpose; there were fellows mean enough for that. All they had to do to cause a twist-off was to speed up the engine.

Breaking Out

Anyhow, there was your "twist-off"; which meant that you had to lift out every inch of your two thousand feet of pipe. You pulled it up, and unscrewed it, four joints at a time—"breaking out," as the men called that operation; each four joints, a "stand," were stood in the derrick, and the weary work went on. You couldn't tell where the break was, until you got to it; then you screwed off the broken piece, and threw it away, and went to your real job, "fishing" for the remainder of your drill pipe, down in the hole.

For this job you had a device called an "overshot," which you let down with a cable; it was big and heavy, and went over the pipe, and caught on a joint when you pulled it up. But maybe you got it over, and maybe you didn't; you spent a lot of time jiggling it up and down—until at last she caught fast, and up came the rest of your pipe! Then you unscrewed the broken piece, and put in a sound piece, and let it all back into the hole, one stand at a time, until you were ready to start again. But this time you went at the rate Dan Rossiger considered safe, and you didn't nag at him for any more "twist-offs!"

So the drilling at Ross-Bankside went on pretty fast, but not too fast—just as it was at the other derricks that were scattered over the region. The drilling crews were impatient, because they all wanted to be first to tap the precious oil.

Ross-Bankside First!

The newspapers were writing reports of the activity in this new oil section, and a hundred thousand speculators and would-be speculators read about it, and got into their cars and rode out to the field where the syndicates had their tents.

Who do you think stood first in the newspaper reports? You would need to make but one guess—Ross-Bankside No. 1. Dad was right there, day and night, knowing the men who were working for him, watching them, encouraging them, scolding them, if need be—and so Dad had not had a single accident, he had not lost a day or night. The well was down to 3,200 feet, and in the first stratum of oil-sand.

They were using an eight-inch bit, and for some time they had been taking a core. Dad was strenuous about core-drilling; he insisted that you must know every inch of the hole, and he would tell stories of men who had drilled through paying oil-sands and never known it. So the drill brought up a cylinder of rock, exactly like the core you would take out of an apple, and Bunny learned to tell shale from sandstone, and conglomerate from either. He learned to measure the tilt of the strata, and what it told the geologist about the shape of things down below, and the

probable direction of the anticline. When there were traces of oil, there had to be chemical analyses, and he learned to interpret these reports.

Dad guessed that he was right over the pool, and so he had ordered his "tankage." So there came a stream of heavy trucks, and stacked up on the field were flat sheets of steel, and curved sheets, all fitting exactly.

You may be sure the oil speculators did not fail to make note of that! They were hanging around the derrick day and night, trying to pick up hints; they followed the men to their homes, and tried to bribe them, or to get into conversation with their wives. As for Bunny, he was about the most popular boy in Beach City; it was wonderful how many kind gentlemen, and even kind ladies there were, anxious to buy him ice-cream, or to feed him out of boxes of candy! Dad forbade him to say a word to strangers, or to have anything to do with them.

The core showed more signs, and Dad gave orders to build the foundations of the tanks; then he ordered the tanks put up, and the clatter of welding machines was heard, and magically there rose three ten thousand barrel tanks, newly painted with flaming red lead. And then—hush!—they were in the real oil-sands. Dad set a crew of Mexicans digging a trench for a pipe line.

In the middle of the night Dad was routed out of bed, and he called Bunny, and they jumped into their old clothes and went racing out to the well, and there were the first signs of the pressure, the mud was beginning to jump and bubble in the hole!

The drilling had stopped, and the men were hastily screwing on the big "casinghead" that Dad had provided. He wasn't satisfied even with that—he sent them to fasten heavy lugs to the head, and he hustled up a couple of cement men and built great blocks of cement over the lugs, to hold her down in spite of any pressure. There wasn't going to be a blow-out on Ross-Bankside No. 1, you bet; whatever oil came through that hole was going into the tanks, and from there into Dad's bank account.

It was time for the "cementing-off," to make the well waterproof, and protect the precious oil-sands. Down there under the ground was a pool of oil, caught under a layer of impermeable rock, exactly like an inverted wash-basin. The oil was full of gas, which made the pressure. Now you had drilled a hole through the wash-basin, and the oil and gas would come to you—but only on condition that you did not let any surface water down to kill the pressure.

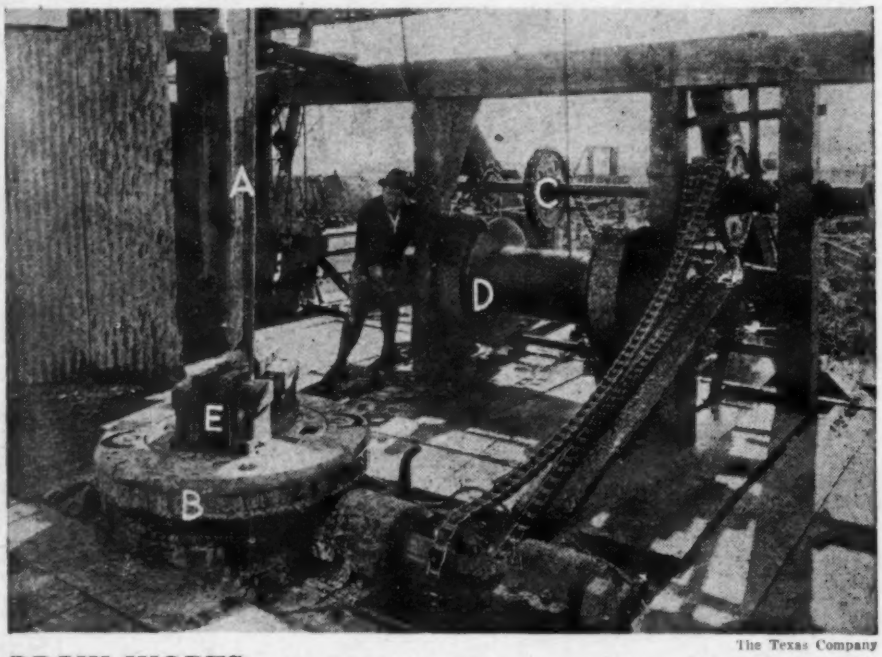
All the way down you had been tapping underground streams and pools of water; and now you had to set a big block of cement at the bottom of this hole, solid and tight, filling every crevice, both inside and outside your casing. Having got this tight, you would drill a hole through it, and on down into the oil sands, thus making a channel through which the oil could flow up, and no water could leak down. This was the critical part of your operation, and the crew was keyed up.

First you put down your casing, known as the "water-string." If you were a careful man, like Dad you ran this "string" all the way up to your derrick-floor. Next you began pumping down clean water; for many hours you pumped, until you had washed the dirt and oil out of the hole: and then you were ready for the cement-men.

They came with a truck, a complete outfit on wheels, ready to travel to any well. Another truck brought the sacks of cement, a couple hundred of them; the job called for pure cement, no sand. They got everything ready before they started, and then they worked like so many fiends—for this whole job had to be put through in less than an hour, before the cement began to set.

It was an ingenious scheme they had, very fascinating to watch. They fitted inside the casing a cast-iron "packer," having rubber discs at the top and bottom, so that it floated on the water in the casing; the cement went on top of this. The sacks were jerked open, and dumped into the hopper of the mixing machine, and the mixer began to revolve, and the river of grey liquid to pour into the hole. It ran fast, and the heavy pumps set to work, and drove it down, stroke after stroke.

In half an hour they had filled several hundred feet of the casing with cement; after which they put on a heavy rubber "packer," fitting tight to the casing; and again the heavy



The Texas Company

DRAW WORKS: **This photograph will give you a still better idea of the way the machinery is set up on the floor of the derrick. Compare the photograph with the diagram on page 7, using the letters A, B, C, D and E to help you identify the important parts. A is the drill pipe which revolves and drills the hole; B is the rotary-table, which turns the drill pipe (the entire length of the pipe, including the bit); C is the gear and chain which transfers power from the steam engine to the hoisting drum (D); E is the "Kelly," which is grooved so that it grips the drill pipe and turns it. The big chain and gear at the right transfers power from the steam engine to the rotary-table. At some wells gasoline or Diesel engines are used.**

Robert Yarnall Richie

THE BIT: **Here you see oil workman (called a "roughneck") with his hand on a bit which will be screwed to the bottom end of the drill pipe. The rotary action of this bit will cut through rock and sand as it digs hole.**

pumps went to work, and drove the mass of cement between the two "packers" down into the hole.

When they came to the bottom, the bottom packer would drop, and the cement would pour in, and the pressure of the top packer would force it into every cranny of the hole, and up between the outside of the casing and the earth—one or two hundred feet high it would rise, and when it set, there you would have your "water shut-off."

What could be more fun to watch than a job like this? To know what was going on under ground; to see men overcoming Nature's obstacles; to see a crew of workers, rushing here and there, busy as beavers or ants, yet at the same time serene and sure, knowing their job, and just how it was going!

Dad Makes Sure

The job was done; and then you had to wait ten days for your cement to get thoroughly set. The state inspector came in and made his tests, to be sure you had got a complete "shut off." If you hadn't, he would make you do it over again—some poor devils had to do it twenty or thirty times! But nothing like that happened to Dad; he knew about "cementing off"—and also about inspectors, he added with a grin.

Anyhow, he got his permit; and now Ross-Bankside No. 1 was drilling into the real oil-sands, going down with a six-inch hole. Every few hours they would test for pressure, to be sure they had enough, but not too much. You were right on the verge of triumph now, and your pulse went fast. It was like waiting for Christmas morning, to open your stocking, and see what Santa Claus had brought! There were crowds staring at the well all day, and you put up rude signs to make them keep their noses out.

Deep Enough Now

Dad said they were deep enough now, and they proceeded to set the last casing—it was known as the "liner," and had holes like a sieve, through which the treasure would flow. They were working late into the night, and both Dad and Bunny had old clothes on, and were bathed in oil and mud. At last they had the "liner" all ready, and the tools out, and they started to "wash" the well, pumping in fresh water and cleansing out the mud and sand. That would go on for five or six hours, and meantime Dad and Bunny would get their sleep.

When they came back, it was time to "swab." You understand, the pressure of the gas and oil was held down by the column of water, two thirds of a mile deep. Now they had what they called a "swab," which was simply a long tool fitted with leather cups and valves. They would let that down, and lift out a lot of water, and dump it down into the sump-hole.

Then they would go down for more water, and presently they would find they didn't have to go down so far, the pressure was shoving the column of water up in the hole. Then you knew you were getting near to the end; one or two more trip of the swab, and the water would be shot out of the hole, and mud and water and oil would spout up over the top of the derrick, staining it a lovely dripping black. You must drive the crowds off the lease now, and shout "Lights out!" to the fools with cigarettes.

There she came! There was a cheer from all hands, and the spectators went flying to avoid the oily spray blown by the wind. They let her shoot for a while, until the water had been ejected; higher and higher, way up over the derrick—she made a lovely noise, hissing and splashing, bouncing up and down!

It was just at sundown, and the sky was crimson. "Lights out!" Dad kept calling. Nobody must even start a motorcar while she was spouting. Presently they shut her off, to try the valve of the casinghead; they worked on, late into the night, letting her spout, and then shutting her off again; it was mysteriously thrilling in the darkness.

30,000 Gal. an Hour

At last they were ready to "bring her in"—which meant they would screw up the "flow-line" between the casinghead and the tank, and let the oil run into the latter. You just let her flow; the gauge showed her coming at the rate of thirty thousand gallons every hour, which meant that the first tank was full by noon the next day.

Yes, that was all; but the news affected Beach City as if an angel had appeared in a shining cloud and scattered twenty-dollar gold pieces over the streets. You couldn't keep such news quiet. The newspapers bulletined the details—Ross-Bankside was flowing 16,000 barrels a day, and as soon as the pipe-line was completed—which would be by the end of the week—its owner would be in possession of an income of something over twenty thousand dollars every twenty-four hours.

$13 Every Minute

Would you need to be told that the crowds stared at Dad and at Bunny everywhere they went about the city? There goes the great J. Arnold Ross, owner of the new well! And that little chap is his son! Say he's got thirteen dollars coming to him every minute of the day or night, whether he's awake or asleep.

Bunny couldn't help but get a sense of importance, and think that he was something special and wonderful. Little thrills ran over him; he felt as if he could run up into the air and fly. And then Dad would say: "Take it easy, son! Keep your mouth shut, and don't go a-gettin' your head swelled. Remember, you didn't make this here money, and you can lose it in no time." Dad was a sensible fellow, you see; he had been through all this before, and knew what it must be to a boy.

The Texas Company

FIELD COMPUTER: After scientists, called geologists and geophysicists, have located (by use of the "doodlebug") underground rock formations which may contain oil, a crew of men, called the seismograph (earthquake) crew, drill a 100-ft. hole into which they place a charge of dynamite. They shoot this off, and a large instrument called the oscillograph records on a strip of photographic paper the time it takes for the sound waves to travel from the dynamite to the surface and down again. A careful study of these strips gives the field computer an accurate picture of the underground area. Photo above shows a field computer "in the throes" of his work, making out a report from the strips. Note strips around his neck.

HEADLINE NEWS

Congress Would Cut WPA; President Asks $875,000,000

The biggest problem which Congress faced during the past two weeks was this: How much money will be needed to carry on WPA until June 30, 1939?

WPA (Works Progress Administration) is the U. S. Government system for giving work to needy men and women who cannot find jobs in private industry. There are 3,460,000 persons all over the United States employed by WPA. They are doing many kinds of work—usually work on building or improving public places, like roads, parks, schools, playgrounds, forests.

Can you describe some of the work WPA has done or is now doing in your community?

To pay WPA workers during the past year, the Federal Government has had to spend $1,944,000,000 (one billion, 944 million). The Government was authorized to spend this much by the last Congress.

That money has now been used up, and more is needed to keep WPA going. President Roosevelt urged Congress to set aside $875,000,000 to pay WPA workers until June 30. The President said that this much was needed to keep the 3,460,000 WPA workers employed.

The House Votes Cut

In granting a sum of money for a certain purpose, just as in making a new law, both houses of Congress must vote in favor of it.

First, the House of Representatives debated the WPA $875,000,000 appropriation (sum of money set aside for a special purpose). Some members of the House wanted to vote the full amount recommended by President Roosevelt. Others thought it was too much, and said "the government has to start economizing some place, and this is as good a place as any." So the House of Representatives decided to cut $150,000,000 off the amount asked by the President.

The Senate Discusses It

The Senate then debated the matter. Before the full Senate discussed it, a committee of Senators, called the Appropriations Committee (consisting of 24 Senators) talked it over. This preliminary committee discussion is held because 24 Senators can make a better study of the problem than the full Senate of 96 members.

The Senate Appropriations Committee, by a vote of 17 to 7, recommended that the appropriation should be cut $150,000,000, just as the House had voted.

The full Senate then debated the matter. Usually the Senate follows the recommendation of its Appropriations Committee. Will they do so now?

As we went to press with this issue of our magazine, the Senate debate was on in full force. Senators Borah and Wagner argued strongly for the full amount asked by the President.

Colonel F. C. Harrington, WPA Administrator (he took the place of Harry Hopkins, who is the new Secretary of Commerce) said that to cut the appropriation would force 400,000 WPA workers out of their jobs during the next six weeks.

N. Y. Times Reporter Expelled From Mexico

In the movies, newspaper reporters are always out "to get the story at all costs," and write it up for their newspapers. But in real life, reporters cannot always tell everything they know. They frequently find it necessary to withhold certain facts so as not to offend persons who might have great influence with the newspaper owners.

Frank L. Kluckhohn is a real-life reporter who wrote as he pleased, and his newspaper—the *New York Times*—published his reports just as he wrote them. Mr. Kluckhohn was the *New York Times* correspondent (reporter) in Mexico. He had his office in Mexico City, and two or three times a week (or as often as the news developed) he would "file" his "story" to the *New York Times*. The phrase "to file a story" is the newspaperman's way of saying "to send a report by telegraph or wireless."

Last week, the Mexican Government told Mr. Kluckhohn to get out of Mexico. They didn't like the kind of stories he was sending to the *New York Times*. Mexican Government officials didn't say exactly what annoyed them, but Mr. Kluckhohn and the *New York Times* said *they* knew, all right. Mr. Kluckhohn had been writing too much about Mexico's plan for swapping some of her oil for some of Germany's and Italy's manufactured goods.

Why is Mexico so touchy about this?

Last year the Mexican Government decided to take control of all oil wells in Mexico. United States and British oil companies had owned these wells. When the companies refused to pay the Mexican oil workers the higher wages asked by the Mexican Government, the Government took over the oil wells and the sale of the oil.

Mexico couldn't sell the oil to the American and British companies. These companies would not buy oil which they claimed was theirs by right. So Mexico, needing money badly, started looking elsewhere for customers. Mr. Kluckhohn learned that Mexico had made deals with Germany and Italy to swap Mexican oil for German newsprint, machinery, automobiles, and other manufactured goods; and for Italian rayon.

Why did Mexican Government officials object to having this news reported? President Cardenas and other Mexican officials realize that many people in the United States are angry over the way Mexico seized the oil wells. Also, President Cardenas knows that relations between the United States and Germany are quite strained just now. So perhaps President Cardenas did not want the American people to know that Mexico was swapping goods with Germany.

Mr. Kluckhohn left Mexico City by airplane and landed at Brownsville, Texas. From there he is now writing his reports to the *New York Times*.

In the meantime, the State Department of the United States Government is investigating the case.

Acme

BOYS IN BLUE: **New slate-blue uniforms for soldiers in the U. S. Army will be tried out for a year at Fort Meade, Md., and if found satisfactory, they will become the official uniform for the Army. Photo above shows the old and the new style uniforms. Soldier at left is wearing the old familiar olive-drab uniform, with buttoned collar and spiral puttees, which must be carefully wound around the legs. Soldier at right is wearing the new slate-blue outfit, with open collar, loose fitting pants, soft cap, and leggings which can be snapped on in a few seconds.**

Turn page for more HEADLINE NEWS

Germany's Bank Gets New Leader

Hjalmar Schacht, head of the German Reichsbank (German government bank), has lost his job. Chancellor Hitler removed him as chief of Germany's finances, and put in a man named Walther Funk.

Why is this important news? Dr. Schacht is famous for his ability as a banker. When the Nazis destroyed the German republican form of government and put in their own dictatorship, Chancellor Hitler needed someone to take charge of government money and the nation's banking system. Dr. Schacht was the man for the job.

Dr. Schacht is now out of the job because he opposed many of the things Hitler has done recently. Schacht advised against them, but his advice was not followed.

There is no use in having a man as adviser if you do not follow his advice. So Hitler decided to take on a man whose advice would be more in line with Nazi policies.

Germany owes a great deal of money to other countries. This debt has become so big that Germany now finds it hard to buy the things she wants from other countries. So Germany uses the barter system with any nation willing to trade with Germany on this basis. The barter system is the same thing as swapping.

One of Germany's great needs is oil. Germany's large mechanized army and her thousands of war planes must have fuel. Germany has no oil of her own. So Germany has made a swap with Mexico for some of Mexico's oil. (See story on page 11, "N. Y. Times Reporter Expelled from Mexico.")

Dr. Schacht wanted Germany to straighten out her finances by spending less money on armaments. But this advice did not appeal to Chancellor Hitler and his Nazi aides.

General Franco's Army Advances on Barcelona

Barcelona, Spain's greatest industrial city and the temporary capital of the Republican (Loyalist) Government, mustered two million citizens last week in the desperate attempt to hold off the Insurgent (Rebel) forces of General Franco.

Mile by mile the Loyalist army retreated until it had no choice but to dig in to defend the city.

As we went to press with this issue of Junior Scholastic, General Franco's army was in the suburbs of Barcelona, and it seemed that the city would fall within several days. Rebels kept up an almost continuous air bombardment of the city.

If Barcelona falls, will the war be over? Loyalist Government officials say that the Republican army will fight to the last man if necessary. The Loyalists begged France, England and the United States to sell them armaments. England and France fear that to do this would anger Premier Mussolini of Italy. He is supporting General Franco and is eager to bring the war to an end.

By a special law passed by Congress, the United States cannot sell arms to either side in Spain. Some people say this is unfair, because Italy can buy arms from us and ship them to General Franco.

Others say that the law should not be repealed, because to repeal it would give the Loyalists a chance for victory. Many Americans who favor General Franco's side claim that the Loyalists are communists. Many leaders of the Roman Catholic Church in America are opposed to aid for the Loyalists.

YANKEES LOSE RUPPERT

When Colonel Jacob Ruppert died on Jan. 13th at the age of 71, few people spoke of his fortune, estimated at many millions of dollars. His brewery, restaurant, and real estate properties in New York City were scarcely mentioned. Ruppert's fame came from something else. It was baseball. He was the owner of the New York Yankees, world's champions.

Colonel Ruppert was a real baseball fan, and his Yankees were more of a hobby for him than a business. He liked nothing better than to see them win. In the World Series he always wanted them to win in four straight games, even though it would mean much more money for him if the series were prolonged to five, six or seven games. He would buy the best ball players he could find, regardless of the price asked for them. He paid them high salaries, and in this way built up a strong team year after year. Babe Ruth, a Yankee from 1920 to 1934, was the biggest single attraction in baseball.

A big-league baseball team is like a big business. The team is owned, just like a business is owned, by stockholders who invest their money in it.

A baseball company, instead of dealing in manufactured goods, deals in ball players. It "buys" players from other teams, and each player signs a contract agreeing to play with a certain team for a certain sum of money. If a player in one of the leagues refuses to sign a contract for the sum of money offered him, he can refuse to play. (Then he is called a "holdout.") But no other team can hire him unless the club that "owns" him agrees to sell him to the other club.

Have You Signed Up?

The new semester is starting and it is time to renew your subscription to Junior Scholastic. Do not delay. Ask your teacher to sign you up for the second semester. The price is the same as last semester. Only in Junior Scholastic can you "Keep Up with Bib and Tuck." At the same time, Junior Scholastic helps you keep in touch with the fast-moving events of our modern world.

READING FOR KEEPS

Score yourself: If you answer all the following questions accurately, you will have a total score of 100. These questions are based on the contents of this issue of Junior Scholastic. After you have filled in the blanks, check your answers against key on page 14. Don't look now!

(I.) Number the three largest oil-producing countries in the world. Number each of the three, 1, 2, or 3, in their proper order. (Score 10 each. Total 30.)

Bolivia, Mexico, United States, Germany, Russia, Venezuela.

My Score ——

(II.) Check the correct ending to the following sentences. (Score 10 each. Total 40.)

Frank Kluckhohn of the *New York Times* was expelled from Mexico for reporting that Germany and Mexico had made a deal which would give Germany some of Mexico's (a) pottery; (b) hot tomale; (c) silver; (d) oil; (e) blankets.

The survivors of the Imperial Airways *Cavalier* were rescued by (a) a Coast Guard cutter; (b) a private yacht; (c) a Standard Oil tanker; (d) a fishing smack; (e) a U. S. gunboat.

To drill an oil well generally costs (a) $250,000; (b) $25,000; (c) $2,500; (d) $250.

The average oil well produces each day about (a) 1 bbl.; (b) 80 bbl.; (c) 8 bbl.; (d) 16,000 bbl.

My Score ——

(III.) Check three of the following things which are made, in whole or in part, from petroleum. (Score 5 each. Total 15.)

(a) gasoline (b) tractors (c) kerosene (d) fuselage
(e) plows (f) mercury (g) automobile lubricants

My Score ——

WORD BUILDER

(IV.) Check the words below which contain the same meaning as either the first half or the last half of the word PETROLEUM. [See headline on page 3.] (Score 5 each. Total 15.)

(a) poetry (b) petrify (c) Petersburg (d) oleomargine
(e) geologist (f) olfactory (g) portfolio

My Score ——

HEADLINE PICTURES

Wide

SENATE PAGE BOYS fight House of Representative pages. Recent snowfall in Washington, D. C., brought out the Capitol's page boys, who lined up in a friendly snowball battle during the luncheon recess.

Wide World

NEW CURFEW law in Cambridge, Mass., prohibits boys and girls under 16 from being on the streets after 9:30 p.m. Photo above shows Police Lieutenant R. J. Douglas reading curfew order to junior high pupils.

GAS & OIL: To make sure that filling stations sell gasoline and oil up to state standards, the State of Illinois runs a traveling inspection service. (See photo below.)

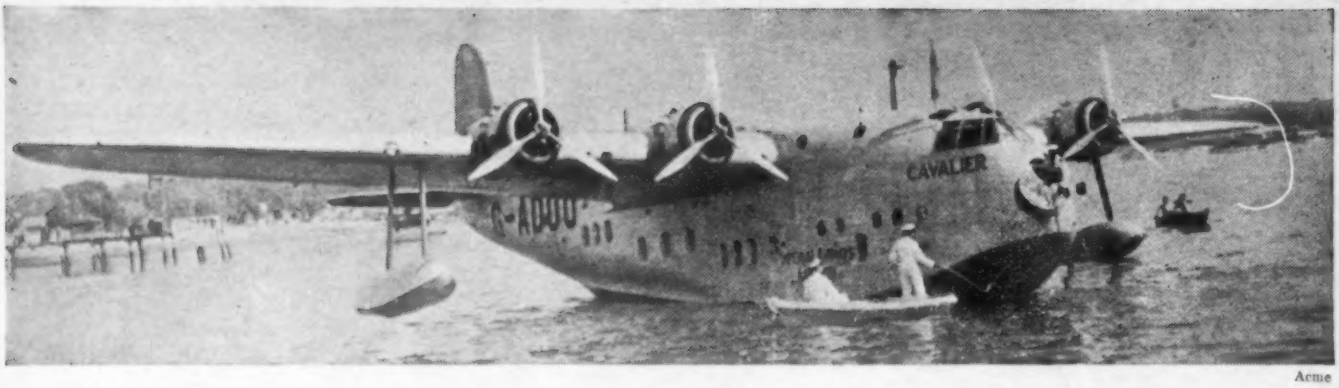
Wide World

Segal

HOW FAR DO YOU SKATE? New invention—the Skate-O-Meter—registers mileage travelled by roller skater. Inset shows close-up of meter, which is built into a wheel. Skate-O-Meter is guaranteed for 1,500 miles.

International

SHARECROPPERS (right) from southeast Missouri and Arkansas recently pitched camps along public highways to protest against being put out of their homes by landowners. Landowners said that the campers were not sharecroppers (who work the land for a share of the crop) but only pickers, hired by the day. About 1,500 were living in the open, and some moved into a rural school house. State troops cleared them off the road, and forced landowners to take some back. The federal government is investigating. Secretary of Agriculture Wallace says he will withhold crop-reduction benefit checks from landowners who deal unjustly with sharecroppers.



Acme

THRILLING RESCUE AT SEA

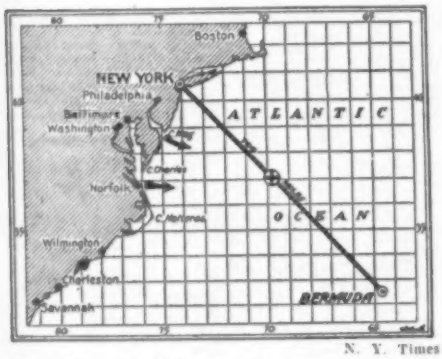
Above: The Cavalier photographed on her recent arrival at Port Washington, Long Island. Dock crew moves her in position for mooring.

A story of high courage and heroism at sea held the nation spellbound last week.

The Imperial Airways (British) flying boat *Cavalier*, eastbound from New York to Bermuda with eight passengers and a crew of five, was forced down on the Atlantic Ocean half way to her goal. The impact of a heavy landing on the crest of a big wave crushed her hull, and before the passengers could put on their lifebelts, the plane was sinking.

The last radio message from the British plane simply said "Sinking."

Nothing more was heard from the *Cavalier*. She floated about fifteen minutes before disappearing into the sea. In that time, Capt. Alderson and his crew directed the passengers to the emergency exits and passed out life preservers. Capt. Alderson advised the passengers to keep together, thus forming a sort of raft of their life preservers. The passengers were not wearing the life preservers—just holding on to them.



N. Y. Times

X marks spot where Cavalier sank. Arrows show departure points of Coast Guard planes.

One of the men passengers, who had been injured in the hard landing, was too weak to hold on, and sank after a half hour.

After eight hours, two more men had to let go. A 24-year-old woman did her best to hold on to one of the men—the ship's steward. He was unconscious and could not help himself. Finally she had to let him go. The other man had tired himself out trying to rescue the first man who went down.

Now there were **ten**—among them two women who had seen their husbands go down. One of these women was 60 years old.

Fortunately, they were in the Gulf Stream and the water was 73° F. The air was 53° F. The sea was heavy with a big swell, but not choppy.

The survivors were worried about sharks which might be attracted by the dead bodies. Chief Officer Richardson and Radio Operator Chapman swam around, kicking up the water to keep sharks away.

Would help never come?

Yes. Rescue ships were on the way.

The S.O.S. and the "sinking" messages had been heard. Two U. S. Coast Guard planes, the Coast Guard cutter *Champlain*, and the U. S. gunboat *Erie*, sped to the area.

A Standard Oil tanker, the *Esso Baytown*, bound from Boston to Texas to take on a load of bulk oil, had picked up the S.O.S.

It was 10:55 at night when the *Esso Baytown* reached the area given by radio. The *Esso Baytown* cruised around, and suddenly Third Officer Winnemore said he heard voices coming from the sea.

"I ordered lifeboat No. 1 into the water," said Capt. Frank Spurr, master of the *Esso Baytown*.

The shouting of the survivors became louder, and then the lifeboat crew spotted two figures swimming. They were the *Cavalier's* first officer and the assistant steward, who swam out from the raft to help direct the lifeboat.

All **ten** survivors were pulled into the lifeboat, which returned to the ship. The survivors, too weak to climb the ladder thrown over the side, were hoisted up in safety belts.

Capt. Spurr then radioed the U. S. gunboat *Erie* and the Coast Guard cutter *Champlain* to send medical assistance. The *Champlain* sent a pharmacist's mate, who supervised the care of the survivors on the 40-hour journey through a gale to New York.

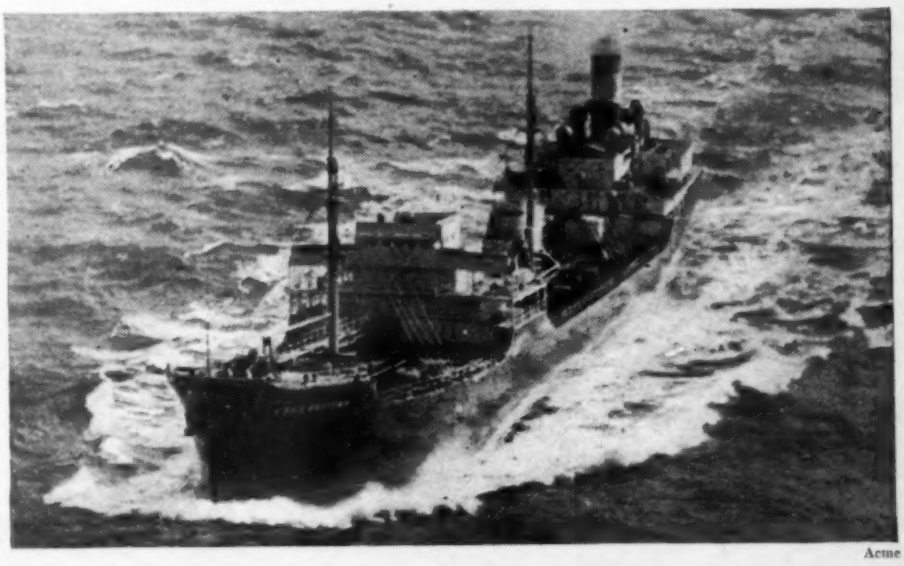
What caused the *Cavalier* to make a forced landing? Her motors failed. It is believed that their failure was due to the formation of ice on the carburetors. An inquiry is now being conducted by the British government.

Reading for Keeps

Answers to Test on page 12.

(I.) United States, Russia, Venezuela.
(II.) d, c, b, c.
(III.) a, c, g.
(IV.) b, d, e.

PLOWING INTO PORT with the ten survivors from the Cavalier, the Standard Oil tanker Esso Baytown nears New York. Photo taken from a plane last Monday afternoon.



Acme

SKYWAYS

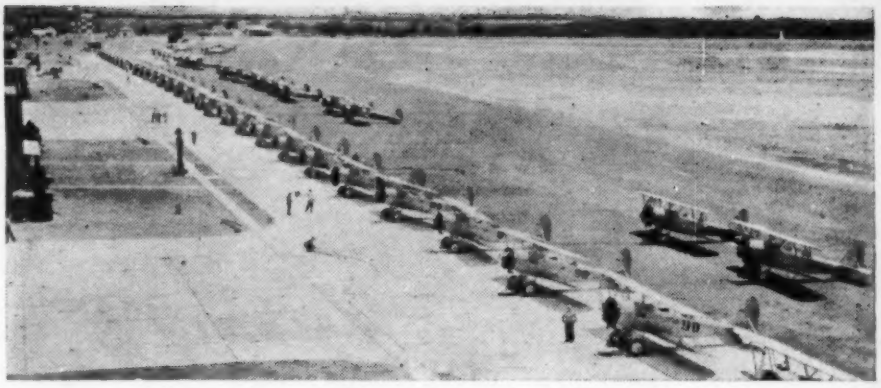
"Wings of the Navy"

IF YOU are interested in the aviation training program of the United States Navy, we strongly recommend that you see the new film, *Wings of the Navy*. From a purely technical standpoint, this is an absorbing picture. Many of the flight shots are of the highest quality, and Warner Bros., who made the film, have evidently taken full advantage of the expert knowledge and advice offered them by the Navy.

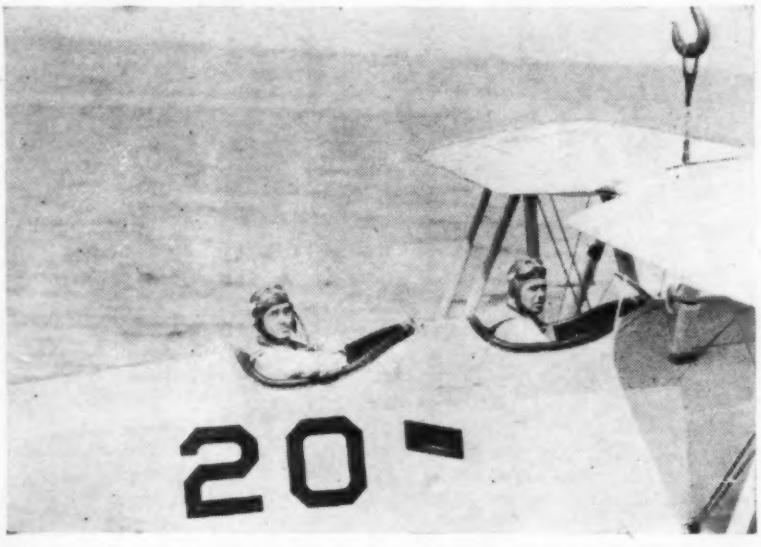
Cass Harrington (played by George Brent) is known as the "best pilot in the Navy." He is also earning a name for himself as a designer of fast, rugged pursuit planes. His younger brother, Jerry, played by John Payne, is in the submarine service. He transfers to Pensacola for flight training where Cass is serving as a senior flight instructor. The audience is taken through the sequence of Naval flight training—first the light, rugged, low-powered land-and-sea planes; then faster, heavier and more powerful trainers in which the students learn to do acrobatics and all the maneuvers needed by a combat pilot; and finally to the actual service types—fighters, scout-bombers, observation and the big flying boats used for long distance patrol and bombing missions.

Close attention has been given to technical details and the picture is not marred by over-emphasis on gruesome crack-ups. It is, however, weakened by a poor plot. The same old routine—famous pilot meets girl—girl meets young brother, young brother gets girl—famous pilot gets fame — EVERYBODY HAPPY!

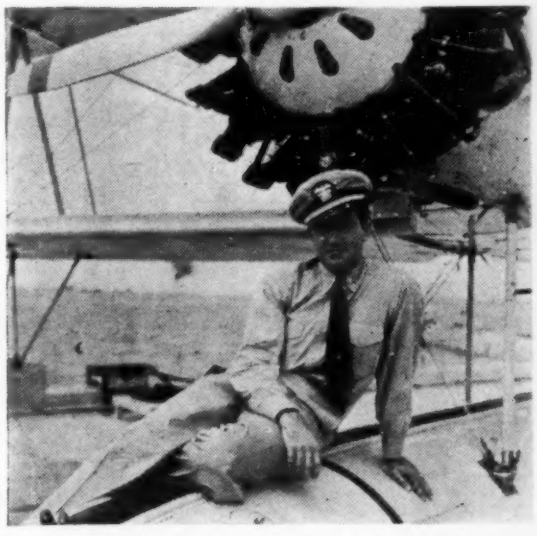
—REGINALD M. CLEVELAND, JR.



ABOVE: Stearman land-plane trainers being fueled at the Pensacola training field.



After land-plane training, the second step in the training program involves the use of over-water equipment. These Stearman trainers are equipped with floats. The plane in the photo above is being hoisted out of the water by a crane, after completing a training flight. Notice the large hook attached to the front of the ship.



Here we see John Payne, who plays the part of Jerry Harrington in the picture, seated on the float of a training plane. These ships are equipped with a single float, in the middle, to protect the propeller from the water.

After many hours of intensive training in slow, low-powered trainers, the fledgling pilots graduate to planes such as these high-powered Vought Scout-bombers (above). Pilots are able to fly these fast planes in formation only after a long and hard training period.

Many of the pilots choose to go into the "big boat" squadron, made up of huge patrol bombers. The picture above shows the cockpit of one of these ships during flight. A successful flight in one of these ships depends on the close co-operation of the entire crew. These planes are used by the Navy to patrol our coastlines. In the above picture, John Payne is the co-pilot (he later becomes a chief pilot), and is sitting at the port side controls (the right side as you look at the picture). Normally, on domestic air liners, the chief pilot sits in that position.

BIB and TUCK

The 8th graders hold a party, with Tuck "directing" the music. Bib wears her one-and-only evennig dress.

BIB could have jumped up and down for joy when Mom finally said yes, she could accept Shucks Conley's invitation to the 8th graders' party. For a while there things had looked pretty gloomy, from Bib's viewpoint, because Mom was dead-set against Bib's going with boys until she was fourteen, at least. "The very idea—you're too young to be having dates!" Mom exclaimed, when Bib came home all a-flutter over Shucks' invitation.

Tuck kept guard over the music box, loaned by Nick's Sweet Shoppe.

"But, Mom," Bib wailed, "this *isn't* 'having a date'. Not the regular sit-on-the-sofa kind anyhow. It's just that every 8th grader is allowed to invite a guest from another grade for this particular party, and Shucks invited me. Naturally, if you invite a girl to be your guest somewhere, you've got to see that she gets there. Besides, it's Tuck's grade that's giving the party and Tuck's on the entertainment committee. And if a brother can't look after his sister, I'd like to know what else he's good for!"

Mom said she wasn't worried about Bib's *being* at the party, though, as much as she was about getting there and back. She simply did *not* approve of twelve and thirteen-year-old girls' being out with boys alone—no matter how "nice" the boys were. Finally, it was Pop who came to Bib's rescue. Good old Pop, who volunteered to get out "Liz" (the Tuckers' jaloppy, which was only used on special occasions) and take a crowd of young folks to the party and then go back for them later and bring them home.

"Wheee!" Bib gave Pop such a hug and a squeeze it nearly threw him off balance. "Pop, you are the swee—"

"Whoa, there," Pop chuckled, "you don't have to hand me a line. I'm your old man!"

The party was to begin at eight o'clock Friday night, so it was arranged that Shucks should be at the Tuckers' house by 7:30. Pop told Bib to "fill up the back seat," so she invited the two Ryan girls, who were 8th graders and lived a few doors down the street, to ride with them. Tuck raised a howl at this.

"But why such a fuss?" asked Mom. "There'll still be room for you and your girl."

"Me—with a girl?" Tuck protested. "Well, I should say not. Girls are silly, and, anyhow, I'm Chairman of the Music, and that's quite a responsibility."

The Chairman in Action

By the day of the party, Mom was convinced that being C. of the M. was certainly a full-time job for Tuck. He had spent every spare moment during the week making telephone calls or business trips downtown. His first idea had been to sign up "Sizzle" Smith's orchestra—the one that had played for the Senior High Christmas dance. But when he found out that "Sizzle" charged $20 an evening, Tuck had to change his tune. (The 8th graders only had $7.50 to spend—refreshments and all!) Tuck was sitting at the soda fountain in Nick's Sweet Shoppe, telling his troubles to Butch Hackenroether, the soda jerker. Nick, the owner, happened to overhear the conversation.

"What's that you say about music for your dance?" asked Nick.

"An orchestra will cost us too much," Tuck informed him.

"Well, I will lend you the automatic record-player. You're all nice kids."

"YOU WILL! Gosh, Nick, that's swell of you," Tuck said spiritedly.

"And I will fix it so you won't need to put nickels in," Nick added. "But you will have to pay one dollar for a good truckman to take it to the school. He must be careful not to jar it."

"Nick, you're a peach. We'll give you a cheer at the party," said Tuck.

Friday, the night of the dance, Tuck was ready and raring to go by seven o'clock and kept yelling upstairs to Bib to hurry. But Bib paid no attention to him. She was very busy—dressing up. At first, she had wondered what to wear, but some of the 8th grade girls said, "Anything goes. We don't make a point of dressing up, because lots of the girls don't have evening dresses, and we want everything to be democratic. But those who have party dresses should wear them." So Bib decided on her one-and-only party dress. It was really last summer's "blue net," but she and Mom spruced it up with a raspberry colored sash and it looked as good as new.

Illustrations by Kate Tracy

Several of the 9th graders asked Bib to dance. The boys came in all sizes.

As the clock struck 7:30, Tuck gave one last yelp at Bib and went to answer the doorbell. Sure enough, it was Shucks, on the dot, and slicked up to beat the band. He was wearing a freshly cleaned-and-pressed blue suit, blue and white striped shirt and a red tie. Shucks politely said "good evening" to Mom and Pop as he met them in the hall.

Wonder of wonders, Bib was ready on time and came downstairs just as Pop was putting on his overcoat. Tuck shooed everybody out to the car as quickly as possible. When they arrived at the Ryans' house, Tuck was all for tooting the horn "to save time" but Pop said Tuck could save time by not arguing and going in after the Ryan girls, like a gentleman should. Tuck hopped out of the car, muttering something about girls being such a bother—never on time. But, evidently, he was wrong about the Ryans. They answered the door, ready to go, and the three of them were in the car in a jiffy.

Pop let them all out in front of the school. Shucks helped Bib out of the car and Tuck stayed long enough to hold the door open for the Ryans, then scooted away, saying, " 'Scuse me. I

This is the eighth article in the Bib and Tuck series, which started with the first issue in September. New subscribers to Junior Scholastic will be interested to know that Bib and Tuck are the nicknames of a brother and sister who are pupils at Jefferson Junior High. Tuck's full name is Emerson Addington Tucker, but you can't expect anybody to call him that. Bib's right name is Elizabeth.

have to arrange about my music box."

Shucks escorted the girls in. As soon as they'd taken off their coats, they went up to say "good evening" to Miss Doolittle, the 9th grade advisor, and Mr. Arkwright, the principal.

During the party, Tuck had a time with his "music box." Every time a record would come near the end, the boys would start edging toward the machine. Everybody wanted to push the button on the dial to select the next record, and once or twice, they pushed and shoved so hard, Tuck was afraid they would scratch the machine. Their favorite records were "Franklin D. Roosevelt Jones," "The Umbrella Man," "Jeepers Creepers," "Stop Beatin' Round the Mulberry Bush," and "You Must Have Been a Beautiful Baby."

All Sizes

Bib had a wonderful time. Several of the 9th graders asked her to dance and she was thrilled to death. Some of the boys were shorter than she, some were fat, some slim. But their size didn't matter to her, just so they could dance! Shucks was nice as he could be. He didn't run off and leave her or gang up with the boys. If another boy came up and asked her to dance, he'd go get another partner, but he always came back to Bib after each dance.

There were games and a treasure hunt. Then more dancing, and, finally, refreshments. Some of the "toughies" among the boys tried to frame a "raid" on the refreshment table, but the entertainment committee got wind of it. So the girls were asked to line up and get their plates of sandwiches and cookies and a cup of punch first. Bib and Shucks took their plates and sat with a group of boys and girls gathered around the music box.

Keeping Pop Awake

Tuck was in his glory. He wouldn't leave his music box for a moment—not even to get refreshments, and it was 11:15, when he finally closed up for the night. Everybody except the clean-up committee and Miss Doolittle had gone. Shucks and Bib and the Ryans were out in the car—"keeping Pop awake," Bib said. When Tuck climbed into the back seat with the Ryans, he said, "Sorry to keep you waiting Pop. But business is business."

"That's right," said Pop, "but I'm afraid you took your job too seriously. Bib tells me you didn't even leave long enough to get refreshments."

"Huh, didn't have to! Toward the last, I made the boys trade me sandwiches and cookies for a chance to pull the lever and choose the next record. Here you are, Pop. The refreshments are on me!" Tuck added, as he dropped a handful of cookies over Pop's shoulder and into his lap.

—Gay Head

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Coe in N. Y. Post

"How 'bout tryin' out your new shovel, Pop—so I can try out my new bike?"

SOME FUN

No Fish Story

Diana Hopkins, 7-year-old daughter of the new Secretary of Commerce, got a big thrill when she made her first visit to her father's new office in the Commerce Building in Washington. She was fascinated by a large fish pond in the lobby of the great building. At the dinner table that night at home, she talked about the fish pond, and said she would like to do something with it.

"What do you want to do with it?" asked Mr. Hopkins.

"Take the fishes out," replied Diana, "and use it for a swimming pool."

A la carte

A rookie soldier was passing the mess hall, and decided he would like to know what was to be served for dinner that night.

"What's on the menu tonight?" he asked the cook.

"Oh, we have thousands of things to eat tonight," the cook replied.

"What are they?" the rookie asked.

"Beans," said the cook.

—*American Legion Magazine*

Rat-a-tat-tat

Don Jones of New Castle, Pa., reports that he saw the following sign on a tourist home:

CLEAN COMFORTABLE ROOMS
HOME COOKED FOOD
REASONABLE RATS

—*American Legion Magazine*

Rat-a-tat & Bzzzzzz

Jones (visiting new dentist for first time): "Have you been a dentist very long, doc?"

The dentist: "No, I was a riveter till I got too nervous to work up high."

—*Classmate*

So you want to be—

Psychiatrist (interviewing troublesome boy): "And what do you want to be when you grow up?"

Boy: "A man."

—*Obey's Follies*

Beat It

"Mary!" cried the cooking teacher, "how on earth did you ever happen to make such a mess?"

"Honest, teacher," said Mary, tearfully, "I was just following the recipe. It said to bring it to a boil and then beat it for 10 minutes, an'—an' when I got back it was all burnt up!"

—*Washington Post*

Hello, Goodbye

Son (entering office): "Well, Dad, I just ran up to say hello."

Dad: "Too late, my boy. Your mother ran up to say the same thing and got all my change."

Fine Feathers

Little Mary was visiting her grandmother in the country and came upon a peacock. After gazing in astonishment, she ran into the house and cried, "Oh, grandma, come and see. One of your chickens is in full bloom."

—Neal O'Hara in *N. Y. Post*

Wooden Nickels

She: "You'll never get rich talking to yourself."

He: "Eddie Bergen did!"

Oh, Bodder!

The scientist will tell you that a calf loves most, his modder.
But we have one down on our farm who's crazy 'bout his fodder.

—*Judge*

Color-Blind

Customer—"What colors have you in window blinds?"

Clerk—"Window blinds are all shades, madam."

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BASTIAN BROS. Dept SH Rochester, N.Y.

NEXT WEEK: Junior Scholastic's big features next week will include many new photographs of dams and conservation projects in the Southwest region of the United States; stories and photos about Pueblo Indians; page of pictures from new movie, "Boy Slaves." Also special picture page in observance of Lincoln's birthday.

A New Huckleberry Finn

HUCK FINN had the itch to run away. He was "half" an orphan. Really, he was close to being a complete orphan, though he had one parent living—his father. But his father was the town drunkard, and didn't count very much in the comings and goings of his son Huckleberry.

Huck had a home with the Widow Douglas, who had adopted him. That was kind of her, Huck thought, but he resented the way she tried to "sivilize" him. He stood it as long as he could, and one day he struck out "on his own."

We hope you have read Mark Twain's great book *The Adventures of Huckleberry Finn*. If you haven't, be sure to do so. Then go to see the new M-G-M film, which will soon be released. The film differs somewhat from the book, and these differences could be the subject for a discussion in your class.

Mickey Rooney plays the part of Huck, and Rex Ingram, a fine Negro actor, plays the part of Jim, the runaway slave who accompanies Huck.

Here are some "stills" from the film.

ABOVE: Huck sits down to the best breakfast he's had since leaving the Widow Douglas' house. Of course, he had to "borrow" this big, beautiful egg. After a few days' diet of berries and fish, Huck cannot resist the temptation to pilfer some "hen fruit." • While poking around an island in the river, Huck comes upon Jim, the Widow Douglas' slave, who is trying to escape into a free state. Huck and Jim join company but they have to keep out of sight of people who might report a runaway slave.

ABOVE: Huck and Jim wade through the river to reach the raft Jim has built.

Before they leave for good, Huck disguises himself as a girl and goes back to town to hear the news. Imagine his surprise when he hears the report that Huck Finn has been murdered by Jim, the slave.

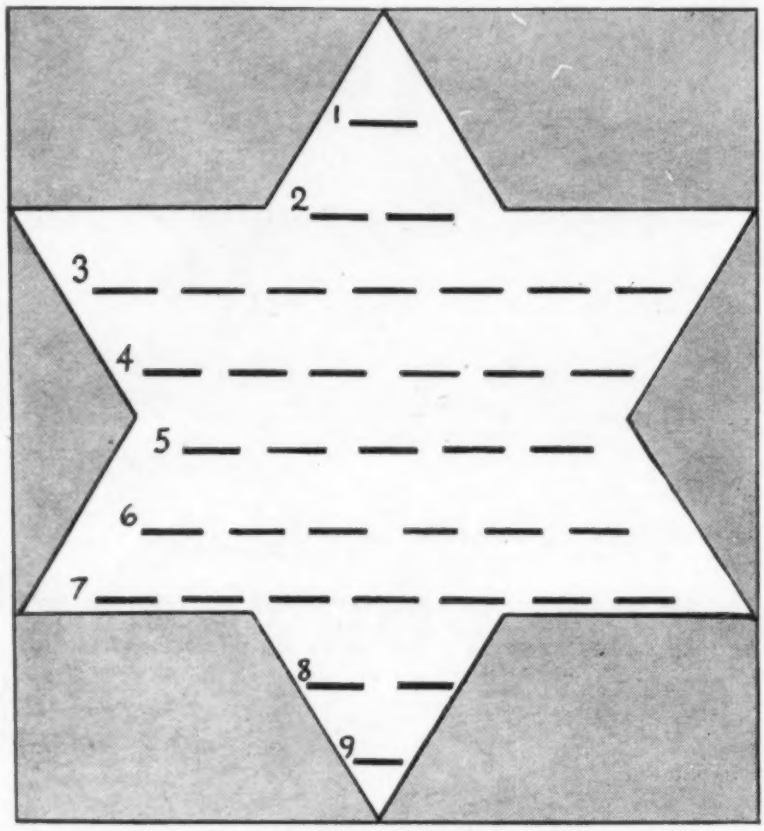
Huck's most exciting adventure later is with two tramps who try to swindle a lot of money from the Wilks sisters. Here Huck reveals the plot to the girls' friend, Capt. Brandy, who saves the money.

MATCH YOUR WITS

Junior Scholastic's Puzzle Page

HEAVENLY BODY

MY STARS, what's this? If you fill out the lines properly, you will have a star full of words. Answer the definitions below and fit the words into their proper places in the star. When you have finished, the nine words reading diagonally from left to right should be the same as the nine horizontal words. Here's wishing you a pleasant astronomical trip.



Definitions

1. *Second letter of the alphabet*
2. *Therefore*
3. *Experimenting; trying*
4. *Breathe out*
5. *Land adjoining the ocean*
6. *One who stares or gazes*
7. *Vessels used to make steam*
8. *A point of the compass*
9. *Seventh letter of alphabet*

SPORTS QUIZ

There are certain expressions common to every sport. Here are ten of these expressions, most of which will be familiar to you. Two or three may stump you! See how many you can team up with the sports listed in the right hand column. Write the proper numbers in front of the words in the right hand column.

1. *Balls and strikes*	*Polo*
2. *Spares and strikes*	*Baseball*
3. *Forty love*	*Football*
4. *Let 'er run*	*Golf*
5. *First and ten*	*Rugby*
6. *Hole in one*	*Basketball*
7. *Coming about*	*Bowling*
8. *Center tap*	*Sailing*
9. *Scrum*	*Tennis*
10. *Chukker*	*Crew*

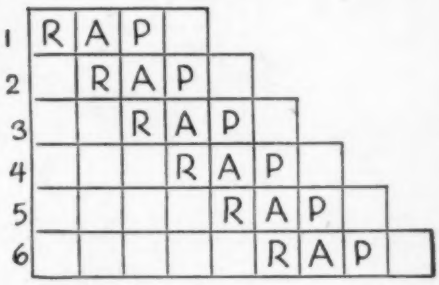
GIVE 'EM THE AX

The puzzle below is a great deal easier than it looks. It contains Grant's famous message from Virginia to the chief of staff in Washington. All we've done is to put an "AX" after each consonant and keep the vowels as they were. For instance, if we were to spell SCHOLASTIC in the "AX" way it would look like this: SAX-CAX-HAX-O-LAX-A-SAX-TAX-I-CAX. Now figure out what Grant said.

"I PAX-U-RAX-PAX-O-SAX-E TAX-O FAX-I-GAX-HAX-TAX I-TAX O-U-TAX O-NAX TAX-HAX-I-SAX LAX-I-NAX-E, I-FAX I-TAX TAX-A-KAX-E-SAX A-LAX-LAX SAX-U-MAX-MAX-E-RAX."

RAP IT UP!

There are several kinds of "raps" in the diagram below. You'll find "easy raps" at the top and "hard raps" at the bottom. Complete the six words containing "rap" by answering their definitions below.



Definitions

1. *Enraptured*
2. *Fruit of a vine*
3. *Strips of leather for binding objects*
4. *Medical science dealing with the application of remedies for diseases*
5. *Unfastens*
6. *Device for transmitting messages*

WORD CREATION

It's surprising how many words can be formed from the same letters. For instance, from the letters AEMST we can form the following words: MATES, MEATS, STEAM, TAMES, and TEAMS. Here are three groups of jumbled letters. See how many words you can form from each group.

OPST *EILV* *EILMS*

LAST WORDS

The words below may look like a code but instead they are the famous last words of an American spy. See if you can rearrange the scrambled letters to spell out the farewell speech of the most important spy of the American Revolution.

"I LYON TREGER HATT I HEVA TUB EON FILE TO VIGE ORF YM COURTNY."

JAN. 21st ANSWERS

YOU'LL HAVE TO SHOW ME came out:

CAMEL	M	LACE
VALISE	I	SLAVE
GLASS	S	LAGS
SPIDER	S	PRIDE
PIANO	O	PAIN
HOUSE	U	SHOE
SPIRAL	R	PAILS
DIAL	I	LAD

In CAPITAL FUN you should have filled in the "crossword" states as follows:

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Then, too, think of the time saved! With a Royal Portable, many a job can be finished in minutes instead of hours. You do more, you have a chance to be more—to stand out among your classmates.

What's more, when you use a Royal Portable, you're readying yourself for college where, students agree, a typewriter is virtually a necessity.

ACT NOW!

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Touch Control*... Permanent Quiet... Finger Comfort Keys... Accelerating Type-Bar Action... Automatic Paper Lock . Genuine Dust Protection... Touch-Set Tabulator... Full Size Keyboard... Many other Office Typewriter Features. Takes paper up to 9½ in. wide. Writes up to 9 in. Uses standard ribbon. Made... tested... guaranteed by Royal, World's largest company devoted exclusively to the manufacture of typewriters.

*Trade Mark for Key-Tension Device

FREE!

Instant Typing Chart. Latest invention. It shows you, at a glance, how to type right. Only Royal has it!

YOURS!

With every Royal Portable, at no extra price, Royal's Duo-Case! Instantly convertible to weekend kit!

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NAME.....

STREET.....

CITY.....*COUNTY*.....*STATE*.....

MAKE ANY OLD TYPEWRITER HELP PAY FOR NEW

I own a..... Typewriter, Serial No..... How much will you allow as a CASH payment on a New Royal?